

CLAIMS

1. An error concealing apparatus comprising:

a detection section that detects, when an error frame
5 is generated, a non-error frame prior to said error frame;

a decision section that decides whether the detected
non-error frame is a speech frame or an audio frame;

a replacement speech frame generation section that
generates a replacement frame for said error frame from
10 the non-error frame decided to be a speech frame through
processing suitable for a speech frame;

a replacement audio frame generation section that
generates a replacement frame for said error frame from
the non-error frame decided to be an audio frame through
15 processing suitable for an audio frame; and

a replacement section that replaces the replacement
frame generated by said replacement speech frame
generation section or said replacement audio frame
generation section with said error frame and conceals
20 said error frame.

2. The error concealing apparatus according to claim
1, wherein said replacement audio frame generation
section comprises:

25 a transient signal detection section that detects
a start position of a transient signal included in said
non-error frame; and

an exclusion section that excludes parts before the start position of the transient signal detected by said transient signal detection section from said non-error frame in generating said replacement frame.

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3. The error concealing apparatus according to claim 1, wherein said replacement audio frame generation section comprises:

a division section that divides said non-error frame
10 decided to be an audio frame into signals of a plurality of frequency bands; and

a generation section that generates said replacement frame by performing extrapolation on said signals of a plurality of frequency bands.

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4. The error concealing apparatus according to claim 1, wherein said replacement audio frame generation section comprises:

a division section that divides said non-error frame
20 decided to be an audio frame into signals of a plurality of frequency bands;

a computation section that computes the degree of periodicity for each of said signals of a plurality of frequency bands; and

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a generation section that generates said replacement frame by performing processing corresponding to the degree of periodicity computed by said computation

section on said signals of a plurality of frequency bands respectively.

5. The error concealing apparatus according to claim
5 4, wherein said generation section replaces said signal with noise or other signals obtained by said division section when the degree of periodicity computed by said computation section is low and performs extrapolation on said signal when the degree of periodicity computed
10 by said computation section is high.

6. The error concealing apparatus according to claim 1, wherein said replacement speech frame generation section comprises:

15 a duplication section that generates a replica of part of said non-error frame; and
an adjusting section that adjusts a replacement position of said replica with respect to said error frame such that a pitch period of said replica matches a pitch
20 period of said non-error frame.

7. The error concealing apparatus according to claim 1, wherein said replacement speech frame generation section comprises:

25 a duplication section that duplicates part of said non-error frame;
an adjusting section that adjusts a duplication

segment in said duplication section such that a pitch period of the replica obtained by said duplication section matches a pitch period of said non-error frame; and

5 a generation section that generates said replacement frame using the replica obtained by said duplication section.

8. The error concealing apparatus according to claim 1, wherein said replacement section performs smoothing
10 on a frame boundary of the replacement frame generated by said replacement speech frame generation section or said replacement audio frame generation section.

9. A communication terminal apparatus comprising the
15 error concealing apparatus according to claim 1.

10. An error concealing method comprising:
a detection step of detecting, when an error frame is generated, a non-error frame prior to said error frame;
20 a decision step of deciding whether the detected non-error frame is a speech frame or an audio frame;
a replacement speech frame generation step of generating a replacement frame of said error frame from the non-error frame decided to be a speech frame through
25 processing suitable for a speech frame;
a replacement audio frame generation step of generating a replacement frame of said error frame from

the non-error frame decided to be an audio frame through processing suitable for an audio frame; and

a replacement step of replacing the replacement frame generated in said replacement speech frame generation step or said replacement audio frame generation step with said error frame and concealing said error frame.